

REMARKS

Claims 1, 4-15 and 17-22 are pending in this application. Claim 1 has been amended. Claim 16 has been canceled. Claim 22 has been newly added.

Claim 1 has been amended to add the phrase, "only subsequently" in step (c) to more precisely express the presently claimed subject matter. Claim 16 has been cancelled without prejudice or disclaimer to the subject matter contained therein. Claim 22 has been added for the subject matter directed to a method for combining a functional material and a bulk material during a polymer melt processing technique wherein the functional material alters the function of the bulk material, comprising the steps as recited therein.

Support for the amendment of claim 1 can be found throughout the present specification as originally filed. Support for newly added claim 22 can be found throughout the present specification as originally filed, for example, original claims 1, 4, 10 and 18, and the description at page 9, lines 12-16 of the corresponding PCT publication.

The amendment and the cancellation of claims are solely for advancing prosecution. Applicants, by amending or cancelling any claims herein, make no admission as to the validity of any rejection made by the Examiner against any of these claims. Applicants reserve the right to reassert the original claim scope of any claim amended herein, in a continuing application.

No new matter has been introduced to this application within the meaning of 35 U.S.C. §132.

In view of the foregoing, further and favorable consideration is respectfully

requested.

- I. At page 2 of the Official Action, claims 1, 4 and 7-21 have been rejected under 35 USC §102(b) as being anticipated by Prince et al. (U.S. Patent No. 5,308,648).***

As the basis of the rejection, the Official Action states in relevant part:

... Prince et al. disclose combining of 1st and 2nd materials in a process comprising: providing a near-critical or supercritical fluid in the form of "viscosity reducing material" (col. Lines 3-68) to form a single phase solution with the materials and then removing the fluid from the solution as a result of the volatility of the supercritical fluid (col. 4, line 49 to col. 5, lines 30). The disclosed first "at least one polymer additive material" is dissolved in a 2nd material fluid ("at least one liquid carrier material", col. 4, lines 49-54). Since the viscosity-reducing material is "mixed" with the liquid carrier material fluid and a single, sprayable (col. 6, lines 2-8), phase is formed, the first polymer additive material(s) become dissolved in the mixture, hence dissolved in the near-critical supercritical fluid/viscosity reducing material (col. 8, line 63 to col. 9, line 10).

... The prince disclosure comprising "recirculation loops" and "recirculators" combined with separate holding tanks and transfer lines, allow for a single phase solution to be formed of mixture of near critical fluid and carrier material(s) with dissolved plastics additive materials, prior to introduction or reintroduction of additional carrier material(s) and/or near critical fluids. ...

... It is responded that in Prince, incorporating all materials into a single phase in which the 1st material(s) is/are dissolved is inherent from an intimate combined mixture being formed and sprayable together and by the option of providing the near-critical or supercritical fluid as a single phase. The order of providing and incorporating facets, and "order of steps" are covered by consideration of the recirculation loops, recirculators and separate transfer lines disclosed in Prince."

Applicants respectfully traverse this rejection. The test for anticipation is whether each and every element as set forth is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987); MPEP § 2131. The identical invention must be shown in as complete detail as is contained in the claim.

Richardson v. Suzuki Motor Co., 9 USPQ2d 1913, 1920 (Fed. Cir. 1989); MPEP §2131. The elements must also be arranged as required by the claim. *In re Bond*, 15 USPQ2d 1566 (Fed. Cir. 1990).

Claim 1 as amended recites “A method for combining a first material and a second material, comprising the steps of (a) providing a fluid which is near or in the supercritical fluid state, (b) at least partially dissolving the first material in the fluid, (c) **only subsequently** incorporating the solution of the first material and the fluid into the second material to form a single phase solution from the first material, the second material and said fluid, and (d) removing said fluid from said solution in order to leave the combined first and second materials.”

As clearly described in amended claim 1, the presently claimed subject matter is a “**method**,” where not only the processing steps themselves are important, but also the order of conducting these steps is likewise important. The claimed method comprises the steps of (a) to (c) **in the order of, first** at least partially **dissolving** the first material in the fluid which is provided near or in the supercritical fluid state, **and then, incorporating** the solution of the first material and the fluid into the second material to form a single phase solution from those three components. In other words, in the present claims, the step (b) for dissolving the first material in the near supercritical or supercritical fluid occurs first, and then the step (c) for incorporating the resulting solution into the second material follows. **This particular order is already an important limitation in the presently claimed method.**

Claim 16 has been cancelled. All of the other rejected claims, namely claims 4, 7-15 and 17-21, are each directly or indirectly dependent from independent claim 1 and thus incorporate all of the limitations of claim 1 as noted above.

In contrast, *Prince et al.* describe a process for applying a polymer additive material to a polymeric substrate comprising the steps of a) forming in a closed pressurized system a mixture of a solid polymer additive material ("first material"), a suitable liquid carrier material ("second material"), and a suitable viscosity reducing material ("supercritical fluid"), and b) spraying this mixture onto a polymeric substrate. However, Prince et al. *fail* to teach the method for forming a single phase of the mixture in the **same order of steps** as claimed in the present claims.

In particular, regarding the process for forming the mixture of all three components, i.e., the first material, the second material, and the supercritical fluid, *Prince et al. teach mixing the first material and the second material, first, to form a slurry, which is subsequently mixed with the supercritical fluid to reduce the viscosity of the slurry to be suitable for spray.* See Prince et al., col. 7, lines 56-65 and col. 8, lines 3-8. See also col. 9, lines 24-28 describing: "The concentration of solid plastics additives in the slurry of additive and liquid carrier material, **prior to addition of the viscosity reducing material**, may range from low values such as ..." (Emphasis added). Accordingly, it is clear that Prince et al. teach the formation of a mixture of three components by the processing order of combining the first and second materials, first, to form a slurry, and then, mixing the supercritical fluid into the slurry. In contrast, the present claims require at least partial dissolving

of the first material to the (near) supercritical fluid and then incorporating the resulting solution into the second material.

In this regard, Applicants note that the Examiner has failed to indicate where Prince et al. disclose the method in the order as required by present claim 1; that is, where Prince et al. disclose mixing a solution of a first material in a "fluid at a supercritical or near supercritical state" with a second material. Applicants submit that present claim 1 is a method claim, and the order of the steps in the method is very important, as emphasised throughout the present application as originally filed. The Examiner appears to be ignoring the specific claimed order of steps in his assessment of the relevance of the Prince et al. reference to claim 1. As indicated above, however, in order to reach a conclusion of lack of novelty of a claim, the Examiner must point out where each and every feature of that claim is disclosed in a single prior art document.

Further, Applicants note that the Examiner states in the Official Action that the recirculation loops, recirculators and separate transfer lines disclosed in Prince et al. cover the orders of steps as required by the present claims. Applicants do not agree with this point; this is incorrect. ***The "recirculation loops" in Prince et al. only allow a mixture of all three materials (i.e., the first material of polymer additives, the second material of a liquid carrier and the supercritical fluid) to be reintroduced into the mixing chamber*** that already contains a mixture of the same three materials. Also, what Prince et al. teach at col. 9, lines 5-9, on which the Examiner relies, is just a combination of several slurries of additives. "When several slurries of additives are to be combined, this may readily be accomplished by having

each in a separate holding tank and introducing it via its own pumping system and transfer line.” See col. 9, lines 5-9. The “slurry” is a mixture of the first material and the second material, ***namely the first and the second materials are already mixed in Prince et al.***, prior to the mixing in the supercritical fluid. ***No disclosure*** of the dissolved first material in the supercritical fluid, prior to it being incorporated into the second material, is found in Prince et al.

Accordingly, it is absolutely clear that Prince et al. fail to teach each and every element of the present claims. Namely, Prince et al. fail to teach the method for combining a first material and a second material, comprising the steps of providing a fluid which is near or in the supercritical fluid state and at least partially dissolving the first material in the fluid, and only then, subsequently incorporating the solution of the first material and the fluid into the second material to form a single phase solution, and removing said fluid from said solution. Rather, Prince et al. teach initially forming a mixture of the first and second materials, and only then adding this mixture of both materials to the supercritical fluid.

As such, Prince et al. fail to establish a *prima facie* case of anticipation of the presently pending claims, and withdrawal of this rejection is respectfully requested.

II. At page 4 of the Official Action, claims 5 and 6 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Prince et al. (U.S. Patent No. 5,308,648) in view of DeSimone (U.S. Patent No. 5,922,833).

As the basis for this rejection, the Official Action states in relevant part:

Claims 5 and 6 differ in requiring that the carbon dioxide being removed by the material by venting or suction, although Prince et al. do disclose the fluid being volatile so as to separate from the material formed by mixing. DeSimone teaches to remove carbon dioxide from formed polymeric materials by venting and suction process steps (col. 5, lines 47-54, col. 9, lines 44-49 and col. 0, lines 18-23). It would have been

obvious to one of ordinary skill in the art to have utilized the suction and venting of DeSimone to more thoroughly remove all of the supercritical fluids to form a more purified end product.

Applicants respectfully traverse this rejection. To establish a *prima facie* case of obviousness, the PTO must satisfy three requirements. First, as the U.S. Supreme Court recently held in *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398 (2007), "a court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions. ... it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does... because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known." Second, the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *Amgen Inc. v. Chugai Pharm. Co.*, 18 USPQ 1016, 1023 (C.C.P.A. 1970). Lastly, the prior art references must teach or suggest all the limitations of the claims. *In re Wilson*, 165 USPQ 494, 496 (C.C.P.A. 1970).

Rejected claims 5 and 6 are dependent from claim 1. In this regard, the discussion of present claim 1 and the teaching of Prince et al. is incorporated by reference herein in its entirety for brevity. Accordingly, Prince et al. fail to teach the order of steps in claim 1, where particularly step (c) can only subsequently follow step (b).

Further, since Prince et al. teach the formation of a mixture of all three components by first mixing a first and a second material, and then mixing them with a supercritical fluid, in order to modify the teachings of Prince et al. to reach the method of present claim 1, it would be necessary to separate the second material (i.e., the liquid carrier) from the mixture of all of the three materials. However, there is no teaching in Prince et al. of how this could be achieved, and from the disclosure of Prince et al. there is no reason why the skilled person would even attempt to try this.

Specifically, the subject matter of the present application relates to an improved method for incorporating a functional fluid into a molten polymer and then subsequently processing the molten polymer to form a final product. In contrast, Prince et al. relate to forming a mixture of a plastic additive and a liquid carrier, reducing the viscosity of this mixture by subsequently mixing this with a supercritical fluid, and then spraying the reduced-viscosity mixture onto a solid polymeric substrate to form a final product. This method is very different to that disclosed in the present application, and therefore requires different considerations in optimising the method steps. In the method of Prince et al., the supercritical fluid is used to reduce the viscosity to facilitate spraying of the mixture of first and second materials (and thus it is acceptable to carry out the method by first mixing the first and second materials and **then** adding the supercritical fluid).

In contrast, in the method of the present claims, the supercritical fluid is used to aid dissolving the first material in the second material. The present inventors have determined that this is facilitated by **firstly** at least partially dissolving the first material in the supercritical fluid, and **only subsequently** incorporating this solution

into the second material. Given the specific function of the supercritical fluid disclosed in Prince et al., there is no reason why the skilled person would alter the specific teaching of that document to arrive at the subject matter of claim 1.

DeSimone does not remedy the deficiencies of Prince et al.

According to the Examiner, the DeSimone reference is cited only to show that a supercritical fluid can be removed from a solution through venting. In this regard, Applicants note that the DeSimone reference discloses a process for making a fluoropolymer wherein the fluoromonomer is solubilized in a solvent in a supercritical state and then polymerizing the fluoromonomer to form a fluoropolymer. When the polymerization is complete, the supercritical solvent is separated off the composition through venting to the atmosphere.

However, DeSimone does not teach or suggest a method for combining a first material and a second material comprising incorporating a solution of the first material and a near supercritical or supercritical state fluid into the second material to form a single phase solution from the first material, second material and said fluid, as recited in step (c) of present claim 1. DeSimone provides ***no guidance*** to modify the order of the method steps as disclosed in Prince et al. to arrive at the method of present claim 1.

Accordingly, Prince et al., taken alone or in combination with DeSimone, teach a method of combining a first material and a second material wherein the first material is at least partially dissolved in the fluid which is near or in the supercritical fluid state and only subsequently added to the second material to form a single phase solution from which the fluid is removed to leave the combined first and

second materials. Prince *et al.* and DeSimone, taken alone or in combination, do not teach or suggest all the limitations of present claim 1, and its dependent claims 5 and 6, and thus cannot render these claims obvious. In addition, neither reference provides any reason or motivation to change the order of the method steps of Prince *et al.* to arrive at the method of the present claims, and thus cannot render these claims obvious.

Applicants respectfully request the Examiner to reconsider and withdraw this rejection of present claims 5 and 6.

CONCLUSION

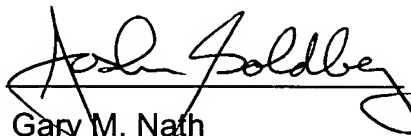
Based upon the above remarks, the presently claimed subject matter is believed be patentably distinguishable over the prior art of record. The Examiner is therefore respectfully requested to reconsider and withdraw all of the outstanding rejections and allow all pending claims. Favorable action with an early allowance of the claims pending in this application is earnestly solicited.

The Examiner is welcomed to telephone the undersigned attorney if he has any questions or comments.

Respectfully submitted,
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Date: August 4, 2009

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